missible to depart from priority in cases of names which have clearly arisen through gross geographic errors on the part of their authors, as for instance, *Asclepias syriaca* L. (which comes from the United States), and *Leptopetalum mexicanum* Hook et Arn. (from the Liu-Kiu Islands.)

12. Hybrids are designated by the names of the parents directly connected by the sign ×, the alphabetical order of the specific names being maintained, *e. g.*, *Cirsium palustre* × *rivulare*. In the position of the names no distinction is made as to which was the father and which the mother plant. To hybrids we consider the binomial nomenclature unsuited.

13. Manuscript names have no right under any circumstances to consideration on the part of other authors, not even when such names appear upon the printed labels of *exsiccati*. The same thing holds in the case of horticultural names or designations in trade catalogues. The recognition of species presupposes a printed diagnosis, which it is true may occur even upon a label of *exsiccati*.

14. An author has no right to alter at will a once published generic or specific name, unless moved to do so by very weighty reasons, such as those in Rule 11.

Signed by A. Engler, I. Urban, A. Garcke, K. Schumann, G. Hieronymus, P. Hennings, M. Gürke, U. Dammer, G. Lindau, E. Gilg, H. Harms, P. Graebner, G. Volkens, L. Diels.

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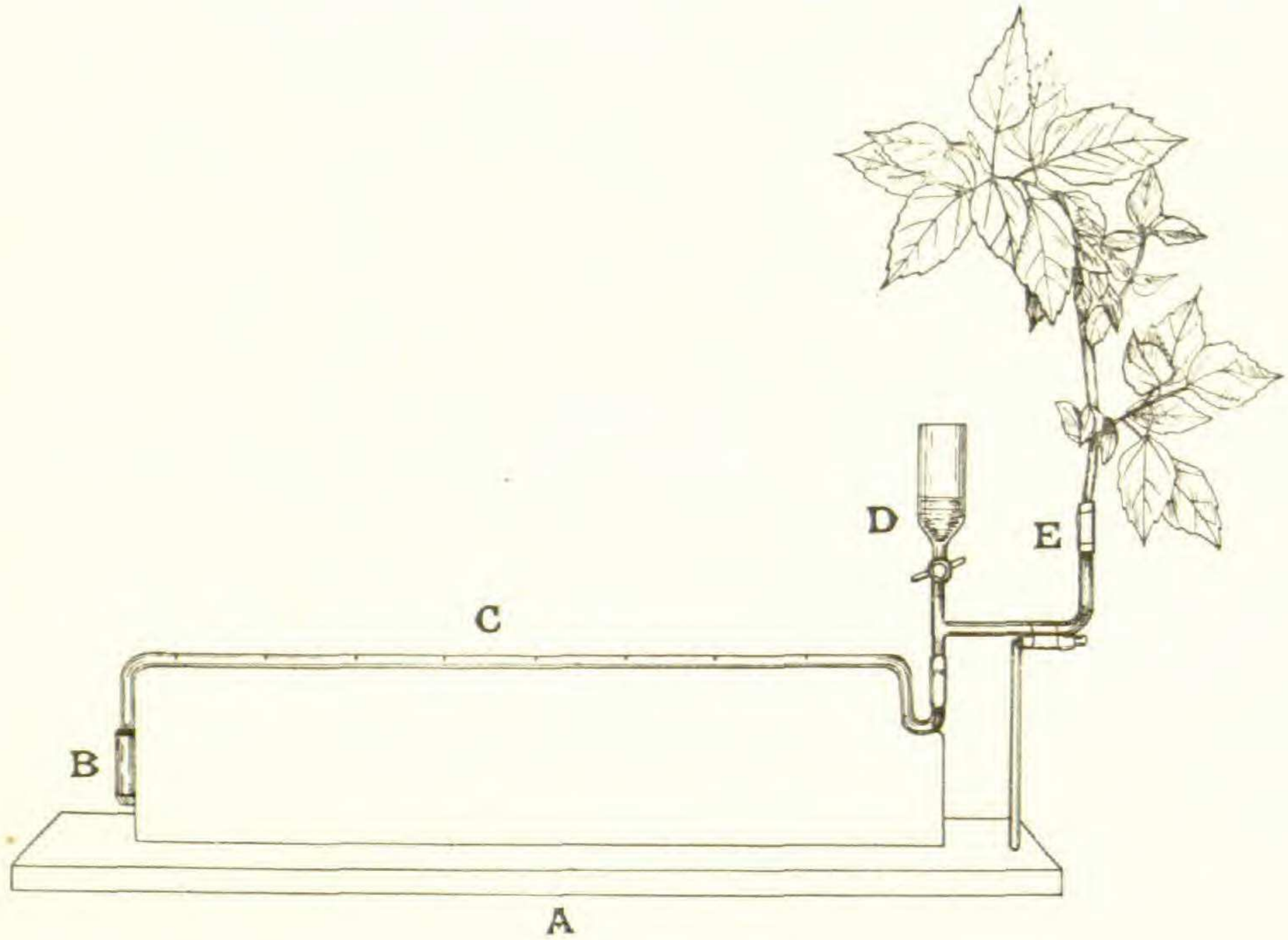
A CONVENIENT POTOMETER.

THE most satisfactory method for the demonstration and exact measurement of the amount of water taken up by transpiring plants or by branches is by the use of the potometer. The simplest form is that used by Darwin and Phillips.[1] Practical instruments have been described by Kohl, Detmer, and others. A modification of Kohl's apparatus, designed in this laboratory, has been found to meet all the requirements of exact measurement, and at the same time is useful in demonstration in the lecture room, where its operations may be witnessed by a class of eighty or one hundred without difficulty. For the latter purpose the apparatus is always ready for use and may be fitted with a plant in five minutes.

The apparatus consists essentially of a horizontal tube of 1^{mm} internal diameter, calibrated into portions containing 100^{mg} of water. At

[1] DARWIN, Physiology of Plants, 73. 1894.

one end a portion 10^{cm} in length is bent downward, and at the other end a portion 20^{cm} in length is bent into U form. To the U-shaped portion is fitted a three-way tube by means of rubber tubing. To one arm of the three-way tube is fitted a shoot, by means of rubber tubing, which should be wired for safety. An entire plant may be used if a



A convenient potometer.— *A*, base; *B*, reservoir for water; *C*, calibrated tube; *D*, separatory funnel for water supply; *E*, fitting of plant and tube.

suitable fitting is used, such as a straight chloride of calcium tube with the plant sealed in by means of moulding clay. The free end of the three-way tube terminates in a separatory funnel.

To determine the amount of water used by a shoot proceed as follows: Place a plant in a reservoir of water, or if a branch only is to be used bend the shoot in such manner that the point of incision is under the surface. Cut off obliquely under water, and fit a section of heavy rubber tubing of the proper size, 5^{cm} in length, to the end of the shoot. For safety the joint should be wired. The fitting should be done under water. Fill the funnel and allow the entire system of tubes to become filled with water free from air bubbles. Also fill the vessel under the end of the tube. Now lift the branch from the water, keeping the rubber tube filled and fit to the tube in such manner as to

exclude air. If the admission of air is unavoidable invert the apparatus and allow it to collect under the funnel.

After the plant has been allowed to stand for a few minutes observations may be begun.

Remove the cylinder of water at *C* and allow a bubble of air, 5^{mm} long, to enter the tube, then replace. Note the exact time necessary for the bubble of air to traverse the calibrated portion of the tube as well as its separate divisions. When the bubble passes the calibrated portion of the tube open the stopcock and drive the bubble beyond the zero-point. The observation can then be repeated.

The conditions of transpiration of the shoot may be controlled by means of a bell glass and by regulation of the temperature, light, etc. The collection of small air bubbles in the tube which are picked up by the moving bubble may be avoided by the use of freshly boiled water allowed to cool in a closed vessel. The increase in the size of the moving bubble would, of course, be a source of error. The use of a horizontal calibrated tube avoids sources of error found in vertical tubes.

For demonstration in the lecture room replace the cylinder of water with one of aniline dye after a bubble has been allowed to enter the tube, and use the end of the colored column as an indicator. A time piece and thermometer may be conveniently placed upon the support as shown in the illustration.

The various precautions necessary to secure normal transpiration data must, of course, be observed. Thus, branches in which negative pressure exists must be allowed to stand in water several hours previous to use. This is illustrated by the following experience. A leafy shoot of fuchsia in which a negative pressure existed was cut off under water at 12:45 P.M. and fastened to the apparatus at 1 P.M. After a few minutes the following observations were made:

1:27	P.M.	Indicator bubble at		0^{mg}.	Temp.	21.0°C.
1:50	"	"	"	" 300	"	21.0
2:05	"	"	"	" 500	"	21.0
2:14	"	"	"	" 600	"	21.0
Readjusted.						
2:17	"	"	"	" 0	"	20.8
2:28	"	"	"	" 100	"	20.7
2:40	"	"	"	" 200	"	20.5
2:57	"	"	"	" 300	"	20.0

This shoot was taken from the apparatus and placed in water. The following morning a small portion was cut from the excised end, and it was refitted to the apparatus with the following results, which show that the negative pressure had been equalized during the first day:

8:09	A.M.	Indicator bubble at		0^{mg}.	Temp.	18.0° C.
8:26	"	"	"	" 100	"	18.0
8:43	"	"	"	" 200	"	18.5
8:45:5	"	"	"	" 300	"	18.5
9:15:5	"	"	"	" 400	"	19.0
9:31	"	"	"	" 500	"	19.0
9:45	"	"	"	" 600	"	19.5
Readjusted.						
9:48	"	"	"	" 0	"	19.5
10:02	"	"	"	" 100	"	19.0
10:17	"	"	"	" 200	"	19.0
10:32	"	"	"	" 300	"	19.1
10:44	"	"	"	" 400	"	19.5
10:57:5	"	"	"	" 500	"	20.0
11:12	"	"	"	" 600	"	20.0
Readjusted.						
11:13:5	"	"	"	" 0	"	20.0
11:26	"	"	"	" 100	"	20.0
11:39	"	"	"	" 200	"	20.1
11:53	"	"	"	" 300	"	20.4
12:05:5	"	"	"	" 400	"	20.7
12:20	"	"	"	" 500	"	21.0
12:33	"	"	"	" 600	"	21.0
Readjusted.						
12:35	P.M.	"	"	" 0	"	21.0
1:40	"	"	"	" 500	"	22.0
1:52:5	"	"	"	" 600	"	22.0
Readjusted.						
1:54	"	"	"	" 0	"	22.0
2:07	"	"	"	" 100	"	22.0
2:20	"	"	"	" 200	"	22.0
2:33	"	"	"	" 300	"	22.0
2:46	"	"	"	" 400	"	22.0
2:58:5	"	"	"	" 500	"	22.0
3:11:5	"	"	"	" 600	"	21.6
Readjusted.						
3:13	"	"	"	" 0	"	21.6

3:25:5	P.M.	Indicator	bubble	at	100[mg].	Temp.	21.5°C.
3:39:5	"	"	"	"	200	"	20.8
Readjusted.							
3:41	"	"	"	"	0	"	20.8
4.58	"	"	"	"	500	"	19.2 C

Net duration of experiment, 8 hours and 38 minutes; total amount of water used, 3.7 grams. The irregular variations in the forenoon were due to gusts of wind and the repeated opening of the doors.

The leaves showed a superficial extension of 300 [sq cm], including the petioles; area of stem surfaces, 40 [sq cm]. April 16 the leaves were stripped from the shoot, the base of which was trimmed and refitted to the apparatus, and the following observations were made:

10:31	A.M.	Indicator	bubble	at	0[mg].	Tem.	17.5° C.
11:12	"	"	"	"	100	"	18.0
11:43	"	"	"	"	200	"	18.8
12:13	P.M.	"	"	"	300	"	17.5
1:23	"	"	"	"	500	"	16.0
2:00	"	"	"	"	600	"	15.1

The data given above demonstrate the value and accuracy of this method of observation.

Valuable data of the transpiration of winter branches and buds, and opening leaf and flower buds have also been obtained by the use of this instrument.

The apparatus was constructed and calibrated by the mechanics whose services are available to the department.—D. T. MacDougal, *University of Minnesota.*

PARTHENOGENESIS IN MARSILIA.

In February 1896 the writer was led to suspect that some prothallia of *Marsilia Drummondii* which had been grown in the laboratory had developed embryos of considerable size without fertilization having been accomplished in every case. In order to determine whether this was possible, and if so to what size the sporophytes would develop, macrospores were isolated from the microspores before the antheridia matured. Spores were sown on February 13 and February 20. At each time two sporocarps were used. Each was cut on one side to admit water more rapidly, and placed in distilled water in a separate dish. In an hour or two all the sporangia were expelled from the